ILLICIT AND INDUSTRIAL STORM WATER CONTROLS: A MUNICIPAL PERSPECTIVE

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Abstract

As part of the Environmental Protection Agency (EPA) Phase 1 storm water requirements, the City of Portland, Oregon (City) was responsible for developing a program to monitor and control pollutants in storm water runoff from industrial facilities to the municipal separate storm sewer system (MS4). In addition, certain classes of industries are required to obtain National Pollutant Discharge Elimination System (NPDES) Industrial Storm Water permits. The EPA, or a State Agency that has been delegated by EPA, administers these permits. Addressing storm water runoff from industries under these separate programs can result in redundant efforts and a less than efficient program. EPA and/or State agencies may not have the resources to adequately administrate and enforce the permitting program while still leaving the municipality liable for the discharges from the MS4.

The City chose to meet the requirement in their municipal storm water permit to control industrial storm water sources of pollution by developing a Memorandum of Agreement (MOA) with the Oregon Department of Environmental Quality (DEQ), (which is the delegated authority) to administrate the permit program. The MOA outlines the responsibilities of the City and DEQ for the implementation of the program, including notification of permit requirements, inspections, compliance, and enforcement issues.

To implement the provision of the Illicit Discharge Elimination Program, the City identified and prioritized 109 major outfalls in the MS4. Maps were developed that outlined the drainage basin and over 3,000 industrial and commercial facilities were researched using building and plumbing records to identify illicit connections. Outfalls are inspected monthly during dry weather and flows sampled to detect the presence of illicit discharges. The City has also developed a citizen complaint program to facilitate the reporting of spills and illicit discharges.

Industrial Storm Water Program

Storm water discharges have been increasingly identified as a significant source of water pollution in numerous nationwide studies on water quality. To address this problem, the Clean Water Act Amendments of 1987 required EPA to publish regulations to control storm water discharges under NPDES. EPA published storm water regulations (55 FR 47990) on November 16, 1990 which require certain dischargers of storm water to waters of the United States to apply for NPDES permits. The regulations include NPDES permit application requirements for storm water discharges associated with industrial activity. EPA has defined this phrase in terms of 11 categories of industrial activity. The DEQ has been delegated by EPA to administrate the program and started issuing Industrial Stormwater permits in 1991.

As a Phase 1 city, Portland was required to develop a program to monitor and control pollutants in storm water runoff from industrial facilities in accordance with 40 CFR 122.26(d)(2)(iv)(C). This creates the potential for redundant efforts and an inefficient program. The City is ultimately responsible for discharges from their MS4. To meet the requirement in their municipal storm water permit and to provide the oversight necessary to protect itself from liability, the City developed the legal authority and entered into an MOA in 1994 with the authorized NPDES state authority (DEQ), to administrate the permits for those discharges to the MS4. The City also inspects and notifies industries that may be required to obtain a permit. The program is administered by a dedicated work group in the City because of the large industrial base and number of NPDES Industrial Storm Water permits (approximately 250) within the City.

Program Elements

Legal Authority

Code was developed in March 1994 to allow the City to have legal authority over storm water discharges to the MS4. Key elements of the code included the requirement for permit holders to submit their Storm Water Pollution Control Plan (SWPCP) and monitoring results to the City, the authority for the Director to adopt administrative rules, inspection authority, and enforcement capability. It was important that the City reviewed the NPDES Industrial Storm Water permit when code was developed to ensure that any City identified inadequacies of the state issued permit were addressed. One example would be the requirement to submit SWPCP and monitoring results to the City as this was not included in the permit.

Another provision that was critical was the ability of the City to implement measures to address facilities that may not be required to obtain a permit. Currently, federal regulations base the requirement for obtaining a permit based on Standard Industrial Classification (SIC) Code and exposure. City experience has shown this to be cumbersome as certain facilities that have activities similar to those facilities that are required to obtain a permit fall under an unregulated SIC Code. There are provisions in the federal regulations to request that the permitting authority issue a permit but this could require that the City undertake sampling and additional work to prove this. This reduces the efficiency of the program in terms of resources and uniformity. This matter was partly addressed by including provisions in the code that allows the City to develop its own permit. However, because of concerns about confusion for the regulated community, plus the current workload of inspecting facilities that may need a permit under the SIC Code criteria, the City has not pursued this effort to date. Other measures, including the requirement for secondary containment and the development of Accidental Spill Prevention Plans, are included in code and used to address non-permitted sites.

Enforcement capabilities, including fines, have been developed for violations of the City's code. Provisions of the code include general discharge prohibitions, reporting requirements, right of entry, inspections, and sampling by City staff, and measures to prevent the entry of wastes to the MS4. Enforcement capability by the City is especially important for "low level" violations, such as late reports. The DEQ is reluctant to enforce on those "low level" violations, other than with notification letters, because the minimum fine is $1,000. Where the City does not have enforcement capability, the City must seek voluntary compliance and refer those violations to DEQ when they are unable to obtain compliance. Failure to apply for a permit and/or develop a SWPCP in a timely manner are referred to DEQ for formal enforcement. This has worked to date, but requires coordination between the City and DEQ. To make this effective, the City worked with DEQ to identify which violations merited referral to DEQ's formal enforcement process.

Memorandum of Agreement

The City entered into a MOA with the DEQ in March 1994, which was revised in 1999. The MOA delineates the responsibilities for the implementation of the program between the two agencies. Language is broad enough to not constrict how the City implements the program. There were two key provisions in the 1999 update of the MOA. One was the submittal of the permit application materials to the City. The City reviews the applications for completeness and then forwards them to the DEQ. This allows the City to track the industries' compliance with applying for a permit once the City has notified them. Previously, the application was submitted directly to the DEQ which proved cumbersome for the City to track compliance with submittal deadlines. In addition, if the application was incomplete, it was returned by the DEQ to the applicant with no clear submittal deadline. Another benefit of submittal to the City is the facilitation of obtaining the Land Use Compatibility Statement (LUCS), which is issued by the City Planning Department. This allows the applicant to submit all the materials at once as opposed to obtaining a LUCS separately. The second provision was the authority granted the City to administrate the permits for those facilities within the City limits but that had storm water discharges through private outfalls. Prior to this, these facilities were rarely inspected nor was there the level of oversight as with the other permittees. To account for the added workload, the MOA included provisions for revenue sharing of permit fees. With approximately 250 permits citywide, this provided adequate funding for one additional City staff person.

Table 1. Oregon DEQ and City of Portland Select Responsibilities and Funding Allocations Under the MOA for City Administration of the NPDES Industrial Storm Water Permit

MOA Element	Oregon DEQ	City of Portland
Permit Application and Review	Review for applicability	Track application submittal, review for completeness, forward to DEQ. Notification of non-compliance and referral to DEQ for enforcement.
Permit Issuance	DEQ responsibility, notify City	
Permit termination	DEQ responsibility, consult City	Confer with action
Site Inspections	Upon request, at discretion	Annual at a minimum
Storm Water Monitoring		Annual, weather permitting
Review of Self Monitoring Data		Review for compliance, notification of non-compliance, and referral to DEQ for enforcement.
SWPCP		Track submittal, review for completeness, notification of non-compliance and referral to DEQ for enforcement.
Enforcement	Upon referral	Enforce City Code, seek voluntary compliance where City doesn't have authority and refer to DEQ whhen unable to achieve voluntary compliance.
Staffing	1 FTE Northwest Region of Oregon	Approximately 3.0 FTE
Application Fee ($670)	50%	50%
Annual Fee ($275)	25%	75%

Permitted Industries

When the City took over the administration of the permits in 1994, 66 facilities were permitted and less than half of them had developed the required Storm Water Pollution Control Plan (SWPCP). Since that time, the City has identified, through inspections, facilities that are required to obtain a permit. At the

time of this report, approximately 250 facilities were permitted. Therefore, the rate of compliance for obtaining a permit has increased dramatically.

Inspections are performed after a review of the SWPCP and other pertinent information in the industry's file. The City utilizes a checklist that includes all the required elements of the SWPCP. This provides a very succinct evaluation to provide to industry. Inspections are usually scheduled in advance with the facility operator but can be performed without notice. Inspection forms are filled out during the inspection and any readily noticeable issues addressed during a post inspection meeting. Inspectors provide technical assistance and information in the form of recommendations, including best management practices (BMPs), using flyers that the City has developed. Each flyer addresses a specific BMP, such as storage of waste materials, sandblasting, employee education, and catch basin maintenance. This allows the City to target specific activities on site and reduces printing costs. Facilities are also evaluated for the presence of illicit discharges. Approximately 15% of the industries had illicit discharges, primarily washwater, identified during the initial inspection. All inspections are followed up with correspondence outlining the findings of the inspection and expectations of the industry. Any item where the industry is not in compliance with the permit is highlighted with a deadline to meet compliance before escalating enforcement is pursued. It is the goal of the program to perform annual inspections, at a minimum, of all permitted facilities.

Table No. 2 Number of Industrial Storm Water Permits Administered by the City of Portland, Oregon

Fiscal Year	94/95	95/96	96/97	97/98	98/99	99/00	00/01	01/02
No. Permitted Facilities	66	70	100	110	125	200	245	259

Storm water sampling of permitted facilities is performed by collecting grab samples at the sample point(s) identified in the facility's SWPCP. Analyses are performed by the City lab and include the parameters listed in the permit. This includes pH, total suspended solids, copper, lead, zinc, and oil and grease. The City may also test for additional parameters that are not included in the general storm water permit. The City's sampling does not relieve the facility from their storm water sampling responsibilities. The results are relayed to the industry and used as a basis to assess the effectiveness of the SWPCP. The City strives to obtain at least one sample annually, weather permitting.

For the City's situation, placing the responsibilities within a dedicated work unit has worked very well. The work section is able to develop expertise in the area while having access to existing information from other City programs, including the City's Pretreatment Program for discharges to the sanitary sewer. Approximately 25% of the facilities that have storm water permits also have industrial pretreatment permits issued by the City. There are currently five staff members that administrate the program for the City, but approximately one-half of their time is spent conducting other activities for the City including addressing non-storm water discharges and source investigation work for programs addressing contaminated sediment.

Other municipalities have adopted this approach while others have incorporated the responsibility into the pretreatment program or other existing programs including fire and safety inspections. The municipality needs to consider several items when determining who will be responsible for implementing a program like this, including the number and type of industries, level of oversight, and oversight of industries by existing programs within the municipality (e.g., pretreatment, hazardous materials, etc.).

Non-Permitted Industries

Industries are also inspected if they are identified as potentially needing a permit. There are approximately 3,000 facilities within the City that have the SIC Code listed in the federal regulations. To perform a general survey of all facilities would have generated much more work than resources allowed. Each site would have to be evaluated prior as the City is a mixture of combined sewers, sumps, and separated storm sewers. Staff spends a considerable amount of time determining where the storm water from the facility discharges to. A municipality may be able to perform a survey if the industrial base is smaller. The City chose to prioritize the search in a systematic manner. Federal guidance states that a system-wide approach to establishing priorities for inspections should be developed.

Initially, the City identified facilities to inspect by searching storm water outfall basins. The basins were prioritized using criteria such as size of outfall, land use (industrialized), water quality concerns of the receiving water, and reported pollution complaints. The basins were delineated for drainage, the industrial facilities identified using our database, and facilities selected by SIC Code. It became readily apparent from these inspections that for the City, certain classes of industries pose more of a pollution risk than others. Auto wreckers, recycling facilities, and certain manufacturing facilities were identified as an inspection priority. Certain light manufacturing, including leather products, electronic equipment, printing, and warehousing and storage facilities posed a much lower risk as their activities are typically indoors. Therefore, the City has adopted an approach that includes sweeps of industries based on SIC Code. Inspections are also performed in response to referrals, field observances, complaints, and an industrial survey performed in support of the pretreatment program. The City has identified approximately 150 additional facilities since 1994 that were required to obtain storm water permits.

In addition, investigation efforts by the City identified the Wholesale Distribution of Construction Equipment (5082) and Heavy Construction Equipment Rental (7353) as significant sources of pollutants. The City identified 20 of these facilities as impacting the MS4 and petitioned the DEQ to issue NPDES General Storm Water permits. These classes are not included in the federal regulations but any municipal program should evaluate these facilities and consider including them in their programs. The number of inspections varies each year depending on the number of permitted industries, staff vacancies, and requests for source investigation work. Generally, each staff member is able to inspect about the same number of non-permitted facilities as permitted facilities. However, as the number of permitted facilities increase, the efforts in this area will decrease.

Table No. 3 Inspection Priorities for the City of Portland, Oregon

Higher Priority SIC Codes		Lower Priority SIC Codes	
5015	Motor Vehicle Parts, Used	23--	Apparel and Other Finished Products
5093	Scrap and Waste Materials	25--	Furniture and Fixtures
33--	Primary Metals Industry	27--	Printing, Publishing and Allied Industries
347-	Coating, Engraving and Allied Services	31--	Leather and Leather Products
7353	Heavy Construction Equipment Rental and Leasing	38--	Measuring, Analyzing, and Controlling Instruments; Photographic, Medical…
20--	Food and Kindred Products		
40--, 41--, 42--	Transportation		
5082	Construction and Mining Machinery and Equipment		

The City has developed several “partnerships” to expand the inspection program. Informational flyers and a poster were developed for Multnomah County Sanitarians to use when they inspect restaurants. A

simple storm water checklist was developed for City commercial recycling staff to use when inspecting retail establishments. In both of these cases, it is important to note that the facilities targeted would not ordinarily be inspected for storm water issues (unless a complaint was received), and that any follow-up issues are then addressed by storm water staff.

Phase II NPDES Storm Water Program

The Phase II regulations did not expand on the category of industries for inclusion in the permitting program. However, there were two significant changes that impact industry. Previously, operators of certain facilities within category eleven (xi), commonly referred to as "light industry," were exempted from the definition of "storm water discharge associated with industrial activity," and the subsequent requirement to obtain an NPDES permit, provided their industrial materials or activities were not "exposed" to storm water (EPA 2000). A light industry operator was expected to make an independent determination of whether there was "exposure" of industrial materials and activities to storm water and, if not, simply not submit a permit application.

As revised in the Phase II Final Rule, the conditional no exposure exclusion applies to ALL industrial categories listed in the 1990 storm water regulations, except for construction activities (category (x)). In addition, an operator seeking to qualify for the revised conditional no exposure exclusion, including light industry, must submit written certification that the facility meets the definition of "no exposure" to the NPDES permitting authority once every five years. A No-Exposure Certification (NEC) form which contains guidance on determining whether a condition of no-exposure exists was developed by EPA (2000) for use in those states where they are the permitting authority. The DEQ has adopted a similar form for use in Oregon, which is a delegated state. It serves as the necessary certification provided they are able to answer all of the questions in the negative. Regulated industrial operators need to either apply for a permit or submit a NEC form in order to be in compliance with the NPDES storm water regulations.

The City is in the process of re-inspecting facilities that previously were not required to obtain a permit because a condition of no exposure existed. Based on inspection results, approximately 20% of the facilities that previously were not required to obtain a permit had exposure of industrial materials and activities to storm water. These sites were then required to apply for a permit or remove the exposure. The City and DEQ have agreed that any submitted no exposure certification would have to be verified with an inspection by the City. The City is also evaluating whether certain facilities and/or sites will need to be inspected prior to the five-year re-certification period.

The Phase II program for municipalities do not include a specific requirement for an industrial storm water control program. However, since municipalities are ultimately responsible for discharges to their MS4, if they have significant industries present, they should consider programs such as described here.

Illicit Discharge Elimination Program (IDEP)

The IDEP program was developed as part of the City's response to 40 CFR 122.26(d)(2)(iv)(B), which requires the municipality to describe a program, including a schedule, to detect and remove (or require the discharger to the municipal separate storm sewer to obtain a separate NPDES permit for) illicit discharges and improper disposal into the storm sewer. The specific elements addressed in the City's IDEP include conducting on-going field screening activities during the life of the permit, investigating the storm sewer system when the results of the field screening or other appropriate information indicate a probable

presence of illicit discharge, procedures to contain and respond to spills, and procedures to promote and facilitate public reporting of the presence of illicit discharges.

Program Elements

Outfall Prioritization

A plan was developed to rank outfalls on the potential for the presence of pollutants found to commonly contaminate receiving waters. Criteria included land use, pipe size, historical problems, pollution complaints and information from outfall monitoring data (both analytical and visual). The prioritization process made it possible for the City to utilize staff and resources in an effective manner by focusing on the outfalls that have the highest potential for pollutant problems. From a total of over 300 storm water outfalls, the City used the criteria to identify 109 on an Outfall Priority List. The list allows the City to develop a reasonable schedule for Dry Weather Outfall Monitoring. After the creation of the outfall priority list, maps of each outfall's drainage basin were created. Maps were made using existing sewer maps, public work as-builts and field inspection records. The largest outfall basin is 475 acres while the smallest is 15 acres. There are approximately 30,000 acres within the MS4 area.

Connection Verification

The Connection Verification Program is a methodical search and documentation of current City building and plumbing records on connections to the MS4. The research was conducted to evaluate all connections to the MS4 from individual property. It took two years, using staff part-time and a summer intern, to evaluate all the properties located in the drainage area of the priority outfalls. Information collected was reviewed looking for questionable connections to the storm sewer system (example – wash racks, trench drains, or loading dock drains going to the storm sewer). If questions arose from a review of the records, a site inspection was performed or referral made to the agency responsible for building inspections. The City identified 15 businesses (out of approximately 3,000) with questionable connections. The process was very time consuming for the results achieved. If a Phase II municipality is considering this work, they need to understand that most illicit connections are mistakes made during the construction phase and reviewing records does not identify these. A benefit of the creation of these records is that it provides information when trying to identify the source of illicit discharges identified at the storm water outfall, and to industrial storm water or similar inspection programs. In addition, once the task is completed, building plan review is in place to address any new development.

Dry Weather Outfall Monitoring

This program has been developed to collect and analyze samples from storm water outfalls using portable field test kits for pollutants that the EPA determined commonly contaminate storm water. This is an effort to obtain defendable evidence of illicit connections and discharges. Monitoring and analysis are conducted on "dry days" (>24 hours with no measurable rainfall) due to the fact that increased flows caused by transient rainfall related storm water runoff dilute pollutant concentrations and make analytical detection and pollutant tracing difficult. The outfall sampling schedule for any given dry day is established by the Outfall Priority List. Outfalls are inspected/sampled at least once a month during the dry weather season (June through September). Outfalls that have tested positive for pollutant(s) are tested more frequently during the month.

The analyses for commonly found storm water pollutants are performed using field meters and test strips. Emphasis during dry weather monitoring is on looking for indicators of pollutants, instead of a long list of individual pollutants. The City currently samples for the following pollutants: pH, temperature, conductivity, copper, iron, residual chlorine and E Coli. All samples are analyzed in the field except for E Coli. This has been scaled back from a much longer list than the City originally analyzed for. This was necessary because of the excessive time required to analyze for the pollutants on the original list. Additional pollutants may be sampled for, depending on the observed or suspected pollutants in the flow. When pollutants are detected at concentrations that indicate the presence of illicit connections or discharges, procedures to identify the source of the pollutant are implemented. Of the 109 storm water outfalls monitored, approximately 40% have flow present. Many times the flow is from groundwater infiltration or stream and ditch diversions. Of the outfalls that have flow, analyses indicate pollutants high enough to warrant an upstream investigation approximately 25% of the time.

Pollutant Discharge Investigation

This program was developed to investigate problems identified through the Connection Verification and Dry Weather Outfall Monitoring. If an outfall tests positive for a pollutant, an upstream investigation is conducted to track and identify the source of the pollutant. Investigations consist of going upstream of the outfall and checking manholes for similar flow and/or visual inspection of streets, driveways and parking lots looking for runoff. Once the discharge is identified, the next step is to determine the severity of the discharge and proceed accordingly.

The City has identified and corrected six illicit connections and twenty illicit discharges. Illicit connections include wastewater from a photo processing lab, two improperly connected bathrooms, and a zamboni pit connected to a storm sewer. Illicit discharges include discharge from a produce company, a broken City sanitary sewer line infiltrating into the storm sewer, a commercial building with a failing septic system leaking to the storm sewer and a steel manufacturing facility with a broken potable water line leaking into City storm sewer. Even though outfalls are inspected monthly, illicit discharges have proven hard to identify. This is most likely due to the number of outfalls and the intermittent nature of the discharges. The City currently has one staff person that utilizes approximately 50% of their time performing the tasks identified with the IDEP. The program has resulted in reduced illicit discharges overall.

Spill Protection and Citizen Response

The City has also developed a citizen complaint program to facilitate the reporting of spills and illicit discharges. A dedicated phone number is staffed 24 hours a day. After hour reporting is recorded on voice mail and the duty officer is paged to retrieve the information. This allows the duty officer to screen the calls and respond accordingly. The duty officer carries a limited amount of spill materials, but works directly with the appropriate agencies, including the City's Fire and Maintenance Bureau's, Coast Guard, and a City contractor to provide containment and clean-up. On average, the City receives approximately 1,500 calls to the complaint line per year. Of these, nearly 50% are registered as water pollution complaints. The remaining calls are referred to the appropriate agency and include noise and nuisance complaints, air quality concerns, etc. Approximately 300 (20%) of the calls come after normal working hours with 25% of these requiring an on scene response either immediately or the next day. The City staffs the position with one full time employee for regular business hours, and utilizes staff on a rotating basis from the Industrial Storm Water, Industrial Pretreatment, and IDEP for after-hours response.

Conclusions

The development of an industrial stormwater program is not one of the six BMPs that Phase II permit holders will be required to be developed. This may be due, in part, to the assumption that all industrial permits would be in place because of Phase I requirements. However, our efforts have shown that only 25-30% of the industries requiring permits had applied prior to the administration of the program by the City.

A municipality may become co-applicants with Phase 1 permit holders. If this occurs, the applicant will become subject to an industrial control program but may be able to utilize the existing program of the permit holder. If a municipality does not develop a program, it is recommended that they work with the permitting authority to identify who has a permit and the status of their compliance. The municipality should also evaluate the industrial base in the MS4 and provide this information to the permitting authority if they identify a facility that may be subject to the program. It may be prudent to incorporate these activities into the illicit discharge elimination program, which is a requirement of the Phase II permit. Whatever the municipality chooses, they need to understand that they are ultimately responsible for discharges from their MS4.

Work to date in the implementation of the IDEP has shown that researching building and plumbing records of facilities was a very time intensive use of resources with very little benefit in identifying illicit connections. Most illicit connections are the result of in-field errors in connections during construction. Time would be better spent conducting dry weather monitoring to identify illicit discharges, although identifying them can be difficult due to the intermittent nature of the discharge. In addition, some illicit discharges may be low in volume and never reach the storm water outfall. These pollutants would then be discharged with the next storm event. Based on this, it may be necessary to move the inspection program upstream in the collection system. However, this would dramatically increase the points of inspection. An alternative would be to monitor storm water quality at the outfall and identify where there are water quality concerns. Upstream inspections of facilities could then be used to identify illicit discharges. The City's Industrial Storm Water program has identified illicit discharges in approximately 15% of their facility inspections.

References

EPA 2000. Guidance Manual for Conditional Exclusion from Storm Water Permitting Based On "No Exposure" of Industrial Activities to Storm Water, U.S. EPA, Office of Water, EPA 833-B-00-001.